REMARKS

The Applicants thanks the Examiner for the thorough consideration given the present application. Claims 1-46 were previously cancelled. Claims 56-78 are cancelled herein without prejudice to or disclaimer of the subject matter set forth therein.

Claims 47-55 and 79-93 are pending. Claims 47, 49, 54, and 55 are amended, and claims 90-93 are added. Claims 47, 48, 49, and 55 are independent. The Examiner is respectfully requested to reconsider the rejections in view of the amendments and remarks set forth herein.

Examiner Interview

If, during further examination of the present application, any further discussion with the Applicant's Representative would advance the prosecution of the present application, the Examiner is encouraged to contact Carl T. Thomsen, at 1-703-208-4030 (direct line) at her convenience.

Drawings

The Examiner has not indicated whether or not the drawings have been accepted. Clarification is requested in the next official communication.

Claim for Priority

The Examiner has not acknowledged the Applicants' claim for foreign priority.

Information Disclosure Citation

The Applicants thank the Examiner for considering the reference supplied with the Information Disclosure Statements filed June 29, 2004 and February 2, 2005, and for providing the Applicants with initialed copies of the PTO/SB/08 forms filed therewith.

Restriction Requirement

The Examiner has made the Restriction Requirement final, and has withdrawn claims 56-89 from further consideration. By this Amendment, the Applicants have cancelled non-elected claims 56-78. Withdrawn claims 79-89 remain pending. The Applicants reserve the right to file one or more divisional applications directed to claims 56-78 at a later date if so desired.

Claim Objections

The Examiner has objected to claim 54 because of an informality. In order to overcome this objection, the Applicants have amended claim 54 in order to correct the deficiencies pointed out by the Examiner. Reconsideration and withdrawal of this objection are respectfully requested.

Rejections Under 35 U.S.C. §103(a)

Claims 47-51 and 54 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Bard (U.S. 5,580,523) in view of Dovichi et al. (U.S. 5,567,294);

claim 52 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Bard (U.S. 5,580,523) in view of Dovichi et al. Yon-Hin et al. (U.S. 6,440,645); and

claims 53 and 55 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Bard (U.S. 5,580,523) in view of Parce et al. (U.S. 5,942,443).

These rejections are respectfully traversed.

Arguments Regarding Independent Claims 47, 48, 49, and 55

Independent claim 48 remains as previously presented.

While not conceding the appropriateness of the Examiner's rejection, but merely to advance prosecution of the instant application, each of independents claim 47, 49, and 55 has been amended herein to recite a combination of elements directed to a biochip assembly for a cell based assay, including *inter alia*

"each transfer conduit having an internal cross sectional area substantially greater than that of each microchannel, such that bidirectional flow of liquid along each of the microchannels may take place."

As is clearly disclosed in the U.S. patent application (U.S. 2007/0077547) as published, the wells 30 are located on both sides of the chip, see also Figure 2 for example. According to page 6, paragraph [0065] of the patent application as published:

"in one preferred embodiment of the invention, there are two sets of at least two wells, one set adjacent to the inlet port and the other set adjacent to the outlet port".

Page 9, paragraph [0134] of the U.S. patent application as published which states that

"*A well 30 adjacent the outlet could be used with the inlet port 22 and vice versa.*"

This is expanded upon on page 9, paragraph [0140] of the U.S. patent application.

Furthermore, this feature is extensively referred to in the specification, e.g. the abstract which states that

"*The input and output ports of the biochip are also periodically connected to the delivery unit of the conduit*",

Moreover, Figures 2, 4, 7, 9, 12, 13, 20 to 24 and the corresponding description of said figures also discloses this aspect.

Thus, it is clear from these passages that that the liquid may flow in both directions through the microchannel.

Therefore, the invention set forth in each of independent claims 47, 48, 49, and 55 facilitates either

i) push-pull type transfer of liquid along the microchannel when the liquid is moving under the influence of the positive or negative pressure in the pump (paragraph [0144]) (i.e. the liquid delivery unit); or

ii) movement of liquid where the input and output conduits are connected to the liquid delivery unit in alteration.

In both cases above the biochip of the present invention allows for a change in direction in the flow of liquid. This has major advantages.

One of the advantages of the invention is that bidirectional flow of liquid along the microchannels is made possible.

Another advantage of the biochip of the invention, is that the bidirectional flow of the liquid along the microchannels enables introduction and exchange of different liquids with the introduction of air bubbles.

Comments on Prior Art Documents

The Bard document does not describe the resealable connection means for transfer of fluid between the well and a chip. Furthermore, Bard does not disclose how the fluids are introduced into the chips in the first place.

The Dovichi et al. document does not disclose or suggest any of these advantageous features. In Dovichi et al., the sample is transferred in one direction, from the wells 30 into the chip and then to the beakers 114 and 116 into the waste collection. There is substantial dead volume of the sample left over in the capillaries 26.

Furthermore, the Applicants strongly contend that the types of experiments on cell adhesion of the present invention cannot be performed using the apparatus of Dovichi et al. In Dovchi et al., the direction of the flow cannot be changed and this is instrumental for the present invention.

Additionally, the capillaries 26 in Dovichi et al. are not "resealable means" according to the present invention and they are permanently fixed at the biochip. In contrast, the present invention is directed to a biochip assay which is resealable. This resealable aspect is a feature of the present invention, is clearly recited in the claims, and is instrumental to sustain

the assays described in the invention, to change liquids, and to avoid formation of the bubbles.

In respect of independent claim 48 in particular, Dovichi et al. do not describe a configuration that is explicitly aimed at interchanging the direction of flow in the microchannel and sending through the microchannel set of different liquids with zero dead volume and without the transfer of air bubbles through the microchannel.

Yon-Hin et al., cited in respect to dependent claim 52, is directed to the screen-printing of microstructures of wells or channels and such does not teach or suggest the biochip as per the amended claim set and merely relates to background art. Parce et al, cited in respect to dependent claim 53 and independent claim 55, merely disclose a continuous flow assay system and also does not teach or suggest the biochip as per the amended claim set.

Thus, The Applicants respectfully disagree with the Examiners rejections and are strongly of the opinion that the step of changing the direction of flow and exchange of liquids sent in the channels is neither taught nor suggested in any combination of the four prior art documents cited by the Examiner. Thus, the present invention would not be obvious to a skilled artisan on the basis of the four prior art documents cited by the Examiner.

At least for the reasons explained above, the Applicants respectfully submit that the combination of elements as set forth in independent claims 48, as previously presented, and independent claims 47, 49, and 55, as amended herein, are not disclosed or made obvious by the prior art of record.

Therefore, independent claims 47, 48, 49, and 55 are in condition for allowance.

The Examiner will note that dependent claim 54 has been amended to place it in better form, and dependent claims 90-93 have been added to set forth additional novel features of the invention.

All dependent claims are in condition for allowance due to their dependency from allowable independent claims, or due to the additional novel features set forth therein.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. §103(a) are respectfully requested.

CONCLUSION

Since the remaining patents cited by the Examiner have not been utilized to reject claims, but merely to show the state of the art, no comment need be made with respect thereto.

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. It is believed that a full and complete response has been made to the outstanding Office Action, and that the present application is in condition for allowance.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, he is invited to telephone Carl T. Thomsen (Reg. No. 50,786) at (703) 208-4030(direct line).

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17, particularly extension of time fees.

Respectfully submitted,

Date: December 4, 2008

By _____
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